Syllabus:

Qualification: MCA, B.E. (CS/IT)

Unit I - Introduction to Computer Concepts, C-Programming, Data Structures, Object Oriented Programming with C++

Characteristics of Computer, Classification of Computers, CPU, Input, Output and Storage Units, Applications of Computers, Memory Hierarchy, Primary memory representation, Secondary storage, Input devices, Output devices, Introduction to "C" Language, Condition and Loops, Arrays, Strings, Structures & Unions, Functions, Pre-processors, Concepts of Pointers, Dynamic Memory Management, File Operations, Abstract data types, arrays, string, structures, pointers, files, stacks, queues, list, trees, application of data structures, Sorting algorithms, searching algorithms, String matching, tree/graph based algorithms, time complexity, space complexity, Introduction to OOP, Classes and Objects, Operator Overloading, Inheritance, Virtual functions, Exceptions and Error handling

Unit II - Database Management Systems, Web Programming

ERdiagrams, Relational Algebra, Relational Database models, Logical View, Keys, Join Operation, Data Models, ER Diagrams, Relational Schema's, Constraints, Views, Normal Forms, BCNF, Transactions, Atomicity, Consistency, Transactions, Conflict Serializability, View Serializability, Dependency Graph, Distributed Databases, Algorithms for Distributed Database, N-tier web based architectures, HTML, Perl, PHP, Dynamic web design, Database access

Unit III - Digital Electronics, Computer Organization and Architecture, Compiler Design, Theory of Computing

Digital signals, Logic Gates, Design and synthesis of combinational and sequential circuits, Counters, Registers, Flip-flop, Machine instructions, addressing modes, System Architecture, Control Processing Unit Components, Arithmetic and Logical Operations, Memory - RAM, ROM, Secondary Storage, Cache, Different types of Caches, I/O devices, I/O Communication, I/O interfaces, Direct Memory Access, Multicores, Multiprocessors, Clusters, Lexical Analysis, Syntax analysis, Ambiguity, Semantic Analysis, Symbol Table, Intermediate Code Generation, Code Optimization, Garbage Collection, Regular Expressions, Deterministic Finite Automaton, Non-Deterministic Finite Automaton, Context Free Grammar, Push down Automaton, Turing Machine, Chomsky Hierarchy, Undecidability

Unit IV - Operating Systems, Computer Networks, UNIX Programming

Windows Operating System, LINUX/UNIX commands and Shell Programming, Threads, Synchronization, Deadlock, Memory Management, Disc scheduling, CPU scheduling, Signals and Daemons, Inter Process Communication, TCP/IP Protocol suite, OSI layers, Network devices, ipv4, Basic concepts of switches, hubs, gateways and routers, Network Architecture, Layers, Application Layer Protocols, Transport Layer Protocols, Network

Layer Protocols, Data link Layer, Physical Layer, Protocols for Wired, Wireless Network, Multipath Protocols

Unit V – Linear Algebra, Numerical Methods, Design and Analysis of Algorithms

Matrix Operations, Eigen Vectors, Eigen Values, Systems of linear equations, Row reduction and echelon forms, Matrix operations, Linear dependence and independence, Determinants and their properties Cramer's Rule, Eigenvalues and eigenvectors, Diagonalization of a matrix, Symmetric matrices, Positive definite matrices, Similar matrices, Linear transformations, Singular Value Decomposition, Newton Raphson Methods, LU Decomposition, Simpson's rules, Searching Algorithms, Sorting Techniques, Brute force Techniques, Exhaustive Techniques, Greedy Algorithms, Graph Algorithms, Divide and Conquer Techniques, Branch and Bound, Dynamic Programming, Complexity analysis